

WHAT IS CLAIMED IS:

1. A laminated duplexer made of a plurality of conductor patterns respectively formed on a plurality of dielectric layers, and connected to an antenna terminal while being connected between transmitting and receiving terminals, comprising:

a transmitting filter electrically connected to the transmitting terminal while including a plurality of resonating strip lines for passing signals of a transmitting frequency therethrough;

a receiving filter electrically connected to the receiving terminal while including a plurality of resonating strip lines for passing signals of a receiving frequency therethrough; and

a matching circuit for matching the transmitting and receiving filters with the antenna terminal, the matching circuit including a transmitting matching unit constituted by a first one of the conductor patterns, the first conductor pattern being electrically connected to an antenna electrode coupled to the antenna terminal while being electrically connected to the transmitting filter, a first ground electrode vertically spaced apart from the first conductor pattern by a certain distance, a receiving matching unit constituted by a second one of the conductor patterns, the second conductor

pattern being electrically connected to the antenna electrode and the receiving filter, and a second ground electrode vertically spaced apart from the second conductor pattern.

5 2. The laminated duplexer according to claim 1, wherein the first conductor pattern of the transmitting matching unit comprises:

 a transmitting-side capacitor electrode spaced apart from the antenna electrode by a certain distance to form a first
10 capacitance for adjustment of characteristic impedance therebetween; and

 a transmitting-side strip line extending from the transmitting-side capacitor electrode to the transmitting filter while having a bent shape, and forming a first
15 inductance.

 3. The laminated duplexer according to claim 2, wherein the first ground electrode is spaced apart from the transmitting-side strip line of the transmitting matching unit
20 by a certain distance, so that first phase-adjusting capacitances are formed between the first ground electrode and the transmitting-side strip line.

 4. The laminated duplexer according to claim 3, wherein
25 the first inductance and the first phase-adjusting capacitances

have electrical lengths set to transform a phase of a signal having the receiving frequency into infinite impedance, respectively.

5 5. The laminated duplexer according to claim 3, wherein the transmitting matching unit has characteristic impedance determined for the transmitting frequency by equivalent impedances of the first inductance, first capacitance, and first phase-adjusting capacitances.

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6. The laminated duplexer according to claim 2, wherein the transmitting filter comprises:

a first capacitor electrode formed at one end of the transmitting-side strip line in the transmitting matching unit;

15 a second capacitor electrode connected to the transmitting terminal;

a first resonating strip line spaced apart from the first capacitor electrode by a certain distance;

20 a second resonating strip line spaced apart from the second capacitor electrode by a certain distance; and

a third resonating strip line spaced apart from the first and second resonating strip lines by certain distances, respectively.

25 7. The laminated duplexer according to claim 6, wherein

the transmitting filter further comprises a cross coupling line spaced apart from the first and second capacitor electrodes by certain distances, respectively.

5 8. The laminated duplexer according to claim 6, wherein the transmitting filter further comprises a loading electrode spaced apart from the third resonating strip line by a certain distance.

10 9. The laminated duplexer according to claim 1, wherein the second conductor pattern of the receiving matching unit comprises:

 a receiving-side capacitor electrode spaced apart from the antenna electrode by a certain distance to form a second
15 capacitance for adjustment of characteristic impedance therebetween; and

 a receiving-side strip line extending from the receiving-side capacitor electrode to the receiving filter while having a bent shape, and forming a second inductance.

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 10. The laminated duplexer according to claim 9, wherein the second ground electrode is spaced apart from the receiving-side strip line of the receiving matching unit by a certain distance, so that second phase-adjusting capacitances are
25 formed between the second ground electrode and the receiving-

side strip line.

11. The laminated duplexer according to claim 10, wherein
the second inductance and the second phase-adjusting
5 capacitances have electrical lengths set to transform the phase
of a signal having the transmitting frequency into infinite
impedance, respectively.

12. The laminated duplexer according to claim 10, wherein
10 the receiving matching unit has characteristic impedance
determined for the receiving frequency by equivalent impedances
of the second inductance, second capacitance, and second phase-
adjusting capacitances.

15 13. The laminated duplexer according to claim 9, wherein
the receiving filter comprises:

a first capacitor electrode formed at one end of the
receiving-side strip line in the receiving matching unit;

a second capacitor electrode connected to the receiving
20 terminal;

a first resonating strip line spaced apart from the first
capacitor electrode by a certain distance;

a second resonating strip line spaced apart from the
second capacitor electrode by a certain distance; and

25 a third resonating strip line spaced apart from the first

and second resonating strip lines by certain distances,
respectively.

14. The laminated duplexer according to claim 13, wherein
5 the receiving filter further comprises a cross coupling line
spaced apart from the third strip resonating line by a certain
distance.

15. The laminated duplexer according to claim 13, wherein
10 the receiving filter further comprises a loading electrode
spaced apart from the third resonating strip line by a certain
distance.

16. A matching circuit of a laminated duplexer made of a
15 plurality of dielectric layers, and connected to an antenna
terminal while being connected between transmitting and
receiving filters to match the transmitting and receiving
filters with the antenna terminal, comprising:

a transmitting matching unit constituted by a first
20 conductor pattern electrically connected to an antenna
electrode coupled to the antenna terminal while being
electrically connected to the transmitting filter;

a first ground electrode vertically spaced apart from the
first conductor pattern by a certain distance;

25 a receiving matching unit constituted by a second

conductor pattern electrically connected to the antenna electrode and the receiving filter; and

a second ground electrode vertically spaced apart from the second conductor pattern.

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17. The laminated duplexer according to claim 16, wherein the first conductor pattern of the transmitting matching unit comprises:

a transmitting-side capacitor electrode spaced apart from the antenna electrode by a certain distance to form a first capacitance for adjustment of characteristic impedance therebetween; and

a transmitting-side strip line extending from the transmitting-side capacitor electrode to the transmitting filter while having a bent shape, and forming a first inductance.

18. The laminated duplexer according to claim 17, wherein the first ground electrode is spaced apart from the transmitting-side strip line of the transmitting matching unit by a certain distance, so that first phase-adjusting capacitances are formed between the first ground electrode and the transmitting-side strip line.

19. The laminated duplexer according to claim 18, wherein

the first inductance and the first phase-adjusting capacitances have electrical lengths set to transform a phase of a signal having a receiving frequency into infinite impedance, respectively.

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20. The laminated duplexer according to claim 18, wherein the transmitting matching unit has characteristic impedance determined for a transmitting frequency by equivalent impedances of the first inductance, first capacitance, and
10 first phase-adjusting capacitances.

21. The laminated duplexer according to claim 16, wherein the second conductor pattern of the receiving matching unit comprises:

15 a receiving-side capacitor electrode spaced apart from the antenna electrode by a certain distance to form a second capacitance for adjustment of characteristic impedance therebetween; and

a receiving-side strip line extending from the receiving-
20 side capacitor electrode to the receiving filter while having a bent shape, and forming a second inductance.

22. The laminated duplexer according to claim 21, wherein the second ground electrode is spaced apart from the receiving-
25 side strip line of the receiving matching unit by a certain

distance, so that second phase-adjusting capacitances are formed between the second ground electrode and the receiving-side strip line.

5 23. The laminated duplexer according to claim 22, wherein the second inductance and the second phase-adjusting capacitances have electrical lengths set to transform the phase of a signal having a transmitting frequency into infinite impedance, respectively.

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 24. The laminated duplexer according to claim 23, wherein the receiving matching unit has characteristic impedance determined for a receiving frequency by equivalent impedances of the second inductance, second capacitance, and second phase-
15 adjusting capacitances.